

on the 27th, and on the Middle and East Atlantic coasts on the 28th. Cautionary Signals were ordered for the Lake ports and on the Atlantic coast from Wilmington to Eastport, but they were not generally justified at the stations.

No. VIII.—This depression, although slight, apparently developed in the Ohio valley, while a second depression was central west of the Mississippi and south of the Missouri. A tornado occurred near St. Louis, Mo., on the morning of the 28th, extending over an area of twenty miles, and proving destructive to crops and buildings. The record of the wind-velocity at the St. Louis station shows the proximity of this disturbance, and that it was of a local character. The region of rain gradually extended to the east and south, with no decided change in the barometer, and a greater portion of the rain of the month fell at the stations in the Middle Atlantic States and near the New England coast on the 29th, 30th, and 31st, while this depression moved southeastward, and passed off the South Atlantic coast.

TEMPERATURE OF THE AIR.

In General.—The temperature has averaged high during the month, especially in the districts east of the Mississippi, and was in no case below the normal, except on the Pacific coast. Comparing chart No. II with that of the previous month, it will be seen the isothermal line of 80° has moved north from the Gulf coast, and approximately follows the 37th parallel between the Alleghany Mountains and the eastern slope of the Rocky Mountains. East of the Alleghanies this line follows the course of the range to the head of the Chesapeake Bay. The isothermal lines of 75° and 70° are deflected to the north as they approach the coast, the latter including within its area a greater portion of the St. Lawrence valley. The influence of the ocean temperature is well marked in the higher latitudes on the eastern coast by the sudden deflection of the isothermal lines 75°, 70° and 65° to the south. It will be seen from the table that the greatest variations from the mean are, +4°·5 in the Lower Lake region, and about +3° in the Middle and Eastern States. Compared with July, 1875, the month has been decidedly warmer in the northeastern districts, and a lower mean prevailed in the Gulf States and Southwest. Compared with July, 1874, the temperature has been lower in the Mississippi, Missouri and lower Ohio valleys. On the Pacific coast the temperature has averaged 69° at San Diego, 59° at San Francisco and 67° at Portland, Or., or only a difference of 2° in temperature for 12° of latitude. Daily reports from the Signal Service telegraph stations in Arizona gave temperatures ranging from 100° to 110° at the observation taken at 4:35 p. m., Washington time.

Maximum Temperatures.—The highest temperatures for the month have occurred as follows: Baltimore, Cape Henry, New York and Washington, 99°; Bismarck, Denison, Lynchburg, Philadelphia, Sandy Hook and Tybee Island, 100°; Denver, Jacksonville, Montgomery and Pittsburgh, 101°; North Platte and Norfolk, 103°; Corsicana, 105; Dodge City, 108°.

Minimum Temperatures.—Temperatures below 47° have been reported as follows: Pembina, 46°; Bismarck, Alpena and Colorado Springs, 45°; Cheyenne and Marquette, 44°; Denver, 43°; Wytheville, 42°; Virginia City, 39°; Mt. Washington, 32°; Pike's Peak, 18°.

Ranges of Temperature.—The greatest ranges of temperature for the month are: Denver, 58°; Bismarck, Dodge City and North Platte, 55°; Marquette, 54°; Alpena and Cheyenne, 52°; Wytheville, 51°; Colorado Springs and Virginia City, 50°. The smallest ranges have been: at New Orleans, 17°; San Diego, 18°; Key West, 19°; Galveston, 21°; Cape Lookout and Mobile, 22°; Cape May, Indianola and San Francisco, 25°.

PRECIPITATION.

The quantity of rain-fall has generally been an excess, compared with that of previous years, although there is a deficiency reported in the Western Gulf States and Upper Missouri valley. Chart No. III appears more irregular than usual, but the distribution of rain-fall does not materially differ from that of the previous month. The areas of over ten (10) inches in the South Atlantic States diminished and moved southward, as is usual, with the advance of summer. A large excess occurred in the Lower Missouri valley, the area extending northward over Iowa and the western portion of Illinois. An excess occurred a little south of the Lake region, which corresponds to a similar excess shown on the chart of the previous month. In comparing the rain-fall in the Lake region with that occurring in the districts east and west of it on the same latitude, it will be seen that the evaporation from these large bodies of water does not increase the precipitation in this region, although the number of days upon which rain falls is greater. Compared with July, 1875, the rain-fall has been more generally distributed; the large area of drought in the Gulf States during that year having received a rain-fall of from four to ten inches. A slight excess of rain occurred on the Pacific coast, but the average for the three stations amounts to only 0.33 inches; while no measurable quantity fell at San Diego.

Rainy Days.—The number of days on which rain fell during the month varies from 11 to 17 in New England; 10 to 18 in the Middle States; 9 to 21 in the Southern States east of the Mississippi; 9 to 13 in the Southwest; 9 to 18 in the Lake region; 14 to 17 in the Ohio valley; and 8 to 15 in the Northwest.

Fog.—Fog has been frequent only on the coast of New England and at San Francisco.

Heavy Rains are reported as follows: Baltimore, 3.14 in. on the 30th; Charleston, 4.87, 16th, and 3.01, 24th; Dubuque, 4.55, 5th; Keokuk, 5.28, 4th and 5th; New Haven, 7.15, 30th and 31st; Newport, 3.45, 23d; Savannah, 3.56, 24th and 25th; Tybee Island, 4.50, 30th; Washington, 4.12, 30th; Southington, Conn., on 30th and 31st, 4.10; Middletown, Conn., on 30th and 31st, 5.75; Riley, Ill., 10th, 3.50; near Independence, Iowa, heavy rain on 4th, damaging railroads, &c.; Ames, Iowa, 1.66 in one hour, 4th; Stanley, Kan., wind and rain-storm 28th, damaging crops, fruits, &c.; Mendon, Mass., all the rain of month, 5.40, fell on 23rd, 30th and 31st; Worcester, Mass., from 3:46 p. m., 30th, to 7 a. m., 31st, 4.55; Waltham, Mass., 4.04 during 24 hours ending 3:40 p. m., 31st; Wet Glace, Mo., 3.90, 12th, and 3.40, 15th; "cloud bursts" in Nevada, at Gold Hill, 22nd and 24th, Genoa 20th, Eureka, 24th; Snowville, Va., 4.7 on 21st, causing damaging floods.

Snows.—Snow occurred at Pike's Peak on the 14th, 15th and 18th; Mt. Washington, 25th and 26th. Carson City, Nev., snowing on mountains on 7th.

Drought.—Rain needed at Mt. Desert, Me., 21st; drought, May 10th to July 22d, Fall River, Mass.; fruit injured by drought and springs low, Litchfield, Mich., 21st; month dry, vegetation scorched, Minneapolis, Minn.; rain needed for corn and cotton crops, Brookhaven, Miss., 31st; crops much damaged by droughts, Richmond, Neb., 31st; drought until 20th, Auburn, N. H.; drought from June 20th to July 22d, Newark, N. J.; drought to 29th, New Germantown, N. J.; very little rain from June 5th to July 23d, Brookhaven, N. Y.; drought very severe at North Hammond, N. Y., 17th; at Kensico, N. Y., crops suffering for rain first part of month; Stapleton, drought June 21st to July 11th; Flushing, N. Y., no rain until 10th; Farmingdale, N. Y., drought until 30th; Nottaway, Va., drought until 10th; Lynchburg, Va., drought very severe, from June 25th to July 28th; Newport, R. I., drought until 23d.

Hail.—2nd, Mendon, Mass.; Ringgold, Ohio; 3rd, Afton, Iowa; 4th, DeSoto, Neb.; 6th, Rockford, Iowa; 7th, Mt. Auburn, Ohio; 9th, Middletown and New London, Conn.; 13th, Richmond, Neb., Le Roy, Wis., Pike's Peak; 14th, Shelburne, N. H.; Pike's Peak, 17th, near Nora Springs, Iowa, Genoa, Neb.; 18th, 22nd and 23d, Pike's Peak; 25th, Buffalo, Rochester and Denver; 26th, Cornish, Me., Pike's Peak; 28th, Afton, Iowa; 29th, Durham, Ark., Purdy, Tenn.

RELATIVE HUMIDITY.

The relative humidity, as reported from the Signal Service stations, averages from 68 to 82 per cent. at the stations on the New Jersey and New England coasts; from 61 to 71 at the stations in the interior of the Middle and Eastern States; from 65 to 77 in the Southern States and Ohio valley; from 68 to 78 in the Lake region; and from 65 to 75 in the Upper Mississippi and Lower Missouri valleys. It is, as usual, lowest on the western plains and the Rocky mountains, being 54 at Bismarck, Dak., and North Platte, Neb., 48 at Colorado Springs, 39 at Denver, 35 at Cheyenne, and 30 at Salt Lake City. The mean of Pike's Peak is 78 and that of Mt. Washington 90.

WINDS.

Prevailing Winds.—The prevailing winds for the month are shown by the arrows on Chart No. II. They have been mostly from the south or southeast in the Gulf States, and Lower Missouri valley; from the south or southwest in the South Atlantic States, Tennessee, the Ohio valley and New England, but have been more variable in the Middle States, the Lake region and the Upper Mississippi valley.

Total Movements of the Wind.—At the Signal Service Stations, the largest monthly movements are, as follows: Mt. Washington, 23,762 miles; North Platte, 12,242; Cape Lookout, 12,020; Dodge City, 11,311; Fort Sully, 10,173; Breckenridge, 9,993; Pike's Peak, 9,456. The smallest total movements are: Wytheville, 2,025 miles; Lynchburg, 2,244; Augusta, 2,320; Nashville, 2,569; Burlington, Vt., 2,739; Shreveport, 2,837; Vicksburg, 2,851. These figures plainly indicate a region of very high winds in the western portions of Kansas, Nebraska, Minnesota, and southwestern Dakota, and an extensive region of light winds in the interior of the Southern States.

Highest Winds.—Among the highest wind-velocities reported from the Signal Stations are the following: Bismarck, 19th, NW., 56 miles per hour; Buffalo, 5th, SW., 60; Breckenridge, 44; Cape May, 4th, W., 48; Denison, 8th, 40; Dodge City, 3rd, S., 46; Escanaba, 56; Fort Sully, 4th, 54; Indianola, 14th, 55; Mt. Washington, 84; North Platte, 7th, 57; Pike's Peak, 8th, 50; Philadelphia, 20th, 40; Port Huron, 5th, 46; St. Paul, 6th, 54; Sandy Hook, 11th, NW., 50; Toledo, 5th, 40.